THIS WAS MADE FOLLOWING REVISION 1 OF THE MACH RANGES DOCUMENT

Goal: Given a single stage high powered model rocket [redacted] with a nose cone, fin brackets, fins, camera mounts, rail buttons, and a boat tail develop a Cd vs. Mach plot for Mach ranges [0.1,1] with step sizes of 0.1.

Naming Convention:

These sims will be referred to as Cd_v_Mach and if referencing the rocket geometry the year and type of rocket should be specified. Additionally the revision of the process that was followed should be included, this one would be r1 for revision 1. For example, the sim name for the 2025 competition rocket would be Cd_v_Mach_r1_2025_comp_rocket. Each iteration in the workbench file should be named after the Mach range it was ran at Ex: 0.1M. If multiple people are running the same years sims add the Mach ranges at the end Ex: Cd_v_Mach_r1_2025_comp_rocket_0.1-0.3

Process:

1. Determine Operating Conditions and Reference Values

We are reporting Cd and Drag force so we need the following information:

Pressure, Density, Viscosity, Temperature, and Reference Area for the rocket at all mach ranges

Open Rocket is a good source for this information

2. Create Folder

In the teams in the official sims folder make a new folder and call it something like Cd_v_Mach_r1_2025_comp_rocket folder but obviously adjust revision number and rocket as needed. In this folder make another folder called geometry files and another called simulation files. Make an excel titled Cd_v_Mach_r1_2025_comp_rocket_results and make 3 columns one for Mach, one for Drag force, and one for Cd.

3. Create all the necessary geometry in SLDW from the Fusion

Create a geometry called all_attached_r1_2025_comp_rocket that is specified in this way:

All attached cylindrical domain filled camera mount, fill drilled holes and seams, fill guides on rail buttons, fill inside. (more specifics can be found in Mach Ranges Revision 1 under M 0.1 geometry step)

Upload the SLDW and STEP file to teams under the geometry file in the sim folder